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EXAMINER	
CHANG, AUDREY Y	
ART UNIT	**PAPER NUMBER**
2872	

DATE MAILED: 09/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	10/803,223	KITAGAWA, HITOSHI
	Examiner	Art Unit
	Audrey Y. Chang	2872

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on July 21, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claim 1.
- Claims 1-8 remain pending in this application.
- The objection to claims 1-8 set forth in the previous Office Action is withdrawn in response to applicant's amendment.

Claim Rejections - 35 USC § 112

1. **Claims 1-8 are rejected under 35 U.S.C. 112, first paragraph**, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1 has been amended to include the *equation* for determining "TSCW" (temperature shift). The specification however fails to teach why would the "TSCW" depends on the "transmissivity of the multilayer film at 25^0 C", but not at factor such as *average refractive index* of the multilayer film. In fact the equation does not reference to any factor concerning the refractive index of multilayer film at all. It is not reasonable since index of refraction of the multilayer film is the most important factor for determining the wavelength characteristics of the filter and therefore closely relates to the temperature shift of the wavelength characteristics of the filter.

Claims 2-8 inherit the rejections from their based claim. Clarifications are required.

Claim Objections

2. **Claims 1-8 are objected to because of the following informalities**:

(1). **Claim 1 has been amended** to include the phrase "TSCW representing the temperature shift" that is confusing and indefinite since it is not clear if this temperature shift is the same or not as the "the temperature shift of the wavelength of the transmitted light" recited before. If the "TSCW" is substantially *zero* by the equation how exactly then is then the "one or more adjusting layer" capable of adjusting the temperature shift of the wavelength of the transmitted light?

(2). **Claim 1 has been amended** to include the phrases including "Possion ratio" and "filling factor" which are confusing and indefinite since it is not clear the "Possion ratio" is referred to what, a ratio defined by what and referred to what? And the it is not clear the filling factor is referred to what either?

Appropriate correction is required.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Chung (PN. 5,212,584) in view of the article "Temperature stability of thin-film narrow-bandpass filters produced by ion-assisted deposition" by Takashashi (Applied Optics Vol. 34, No. 4 pages 667-675).

Claim 1 has been significantly amended which necessitates the new grounds of the rejection.

Chung teaches a *tunable etalon filter* that is comprises a *substrate* (10, Figure 1) and a *multilayer film (12 or 22, Figure 1, 44 or 46 Figure 2)* including a *plurality of dielectric thin-film layers* having high and low refractive indices that are *alternatively* stacked on at least one surface of the substrate. **Chung** teaches that the etalon filter further comprises a *spacer layer* (22 or 42) whose refractive index is thermally adjusted so that the etalon filter is thermally tuned such that the temperature shift of the wavelength of the transmitted light is adjusted, (please see column 2).

Claim 1 has been amended to include the equation for calculating the value of temperature stability of the center wavelength (TSCW) of the filter and the value of TSCW is substantially zero. Chung teaches that the temperature stability of the center wavelength or resonance wavelength of the filter depends on the factors such as the *temperature coefficient of refractive index*, the *thermal expansion coefficient* and the *temperature*, (please see column 2, line 57 to column 3, line 16). But it does not teach explicitly about the equation for calculating the TSCW. **Takashashi** in the same field of endeavor teaches explicitly about obtaining temperature stability of thin-film filters, wherein the filter has *multilayer* thin films of *alternatively* arranged high refractive index layer and low refractive index layer. Takashashi teaches explicitly that he temperature stability of the center wavelength (TSCW) of the multilayer thin-film filter can be obtained by the equation (19), which includes factors such as averaged packing density (or filling factor) of the multilayer filter, the average refractive index of the filter, the Possion ratio of the multilayer filter, coefficient of linear expansion of the substrate (CLES) and the coefficient of linear expansion of the filter, and the temperature coefficient of the refractive index, (please see pages 669-670). Takashashi further teaches that by selecting materials having appropriated values for the various factors for determining the TSCW, the value of TSCW can be made to be substantially zero, (please see Figures 4—8 and 11). It would then have been obvious to one skilled in the art to take the teachings of **Takashashi** to use the equation of TSCW to design the tunable etalon filter of **Chung** to

have essentially zero TSCW so that the filter has good stability under the influence of temperature variation.

With regard to claim 2, this reference does not teach explicitly to have the temperature adjusting layer been placed *directly* on the substrate. However one can view the multiplayer (44, Figure 2) as the "substrate layer" and the spacer layer (42) is then interposed between the multilayer film (46) and the substrate (44) and directly formed on the "substrate".

With regard to claims 3 and 7, Chung teaches that the multilayer film may include ZnS, ThF_4, SiO_2 and Si as low and high refractive index thin film layers and the spacer layer can be either of ZnS or Si which is the *same* material as one of the high and refractive index layer, (please see column 3 lines 30-35, column 4 line 30-35, and column 5 lines 1-12).

With regard to claim 4, this reference also does not teach to include a plurality of adjusting layers. However the ideas of having the layer with temperature adjustable refractive index is explicitly taught in the cited reference, it would have been obvious to one skilled in the art to modify the filter arrangement by having more than one layer of temperature adjustable refractive index so that the temperature related wavelength shift may be adjusted with more degrees of freedom.

With regard to claim 5, although this reference does not teach that the material for the adjusting layer or spacer layer to be different from the layer materials of the multilayer film such modification would have been obvious to one skilled in the art since Chung has already taught the *condition* for the adjusting layer to work to modify the system to use a different yet suitable material would have been obvious modification to one skilled in the art for the benefit of using other material that would provide an alternative filter arrangement. It also has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

With regard to claim 6, Chung teaches that the spacer layer may has a thickness of 16.5 micrometer, (please see column 4, line 47).

5. Claims 1, 2, 3, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Stowell et al (PN. 5,851,679) in view of the article "Temperature stability of thin-film narrow-bandpass filters produced by ion-assisted deposition" by Takashashi (Applied Optics Vol. 34, No. 4 pages 667-675).

Claim 1 has been significantly amended which necessitates the new grounds of the rejection.

Stowell et al teaches a *multilayer dielectric stack coating* that is comprises a *substrate* (22, Figure 2) and a *multilayer film* including a *plurality of dielectric thin-film layers* (26, 28 and 30) having high and low refractive indices that are *alternatively* stacked on at least one surface of the substrate. **Stowell et al** teaches that the multilayer dielectric stack coating further comprises a *thermal barrier coating* (24) that is interposed between the substrate and the multilayer film for preventing the heat entering the multilayer film which serves as the adjusting layer for preventing therefore adjusting the temperature shift of the wavelength of the light filtered by the coating system.

Claim 1 has been amended to include the equation for calculating the value of temperature stability of the center wavelength (TSCW) of the filter and the value of TSCW is substantially zero. This reference fails to teach such explicitly. **Takashashi** in the same field of endeavor teaches explicitly about obtaining temperature stability of thin-film filters, wherein the filter has *multilayer* thin films of *alternatively* arranged high refractive index layer and low refractive index layer. Takashashi teaches explicitly that he temperature stability of the center wavelength (TSCW) of the multilayer thin-film filter can be obtained by the equation (19), which includes factors such as averaged packing density (or filling factor) of the multilayer filter, the average refractive index of the filter, the Possion ratio of the multilayer filter, coefficient of linear expansion of the substrate (CLES) and the coefficient of linear expansion of the

filter, and the temperature coefficient of the refractive index, (please see pages 669-670). Takashashi further teaches that by selecting materials having appropriated values for the various factors for determining the TSCW, the value of TSCW can be made to be substantially zero, (please see Figures 4—8 and 11). It would then have been obvious to one skilled in the art to take the teachings of **Takashashi** to use the equation of TSCW to design the multilayer dielectric thin-film layer of **Stowell** et al to have essentially zero TSCW so that the filter has good stability under the influence of temperature variation.

With regard to claims 3 and 7, Stowell et al teaches that the multilayer film may include TiO_2, ZrO_2, SiO_2, Ta_2O_5 and HfO_2 as high and low refractive index thin film layers and the thermal barrier coating layer can be of zirconia (i.e. ZrO_2) which is the *same* material as one of the high and refractive index layer, (please see column 3 lines 55-65, and column 4 line 12-15).

6. Claims 1, 3, 4, 5, 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Gaebe (PN. 6,600,604) in view of the article "Temperature stability of thin-film narrow-bandpass filters produced by ion-assisted deposition" by Takashashi (Applied Optics Vol. 34, No. 4 pages 667-675).

Claim 1 has been amended significantly that necessitates new grounds of rejection.

Gaebe teaches an *athermal thin film filter* that is comprised of a *substrate* (105, Figure 1 or 605 of Figure 6) and a *multilayer* film (115, 120 of Figure 1 or 615, or 620 of Figure 6) including a *plurality of dielectric thin-film layers* (130 and 132 or 630 and 632) having high and low refractive indices that are *alternatively* stacked on at least one surface of the substrate. **Gaebe** teaches that the *substrate* of the thin film filter *serves* as an *adjusting layer* such that it adjusts the temperature related wavelength shifts by reducing such shift, (please see column 3, lines 6-14).

Claim 1 has been amended to include the equation for calculating the value of temperature stability of the center wavelength (TSCW) of the filter and the value of TSCW is substantially zero.

Gaebe does not teach explicitly about the equation of calculating the value of TSCW. **Takashashi** in the same field of endeavor teaches explicitly about obtaining temperature stability of thin-film filters, wherein the filter has *multilayer* thin films of *alternatively* arranged high refractive index layer and low refractive index layer. Takashashi teaches explicitly that he temperature stability of the center wavelength (TSCW) of the multilayer thin-film filter can be obtained by the equation (19), which includes factors such as averaged packing density (or filling factor) of the multilayer filter, the average refractive index of the filter, the Possion ratio of the multilayer filter, coefficient of linear expansion of the substrate (CLES) and the coefficient of linear expansion of the filter, and the temperature coefficient of the refractive index, (please see pages 669-670). **Takashashi** further teaches that by selecting materials having appropriated values for the various factors for determining the TSCW, the value of TSCW can be made to be substantially zero, (please see Figures 4—8 and 11). It would then have been obvious to one skilled in the art to take the teachings of Takashashi to use the equation of TSCW to design the athermal thin film filter of **Gaebe** to have essentially zero TSCW so that the filter has good stability under the influence of temperature variation.

With regard to claims 3 and 7, Gaebe teaches that the multilayer film may include SiO_2, and Ta_2O_5 as low and high refractive index thin film dielectric layers and the substrate or the adjusting layer can be of quartz (i.e. SiO_2) which is the *same* material as one of the high and refractive index layer, (please see column 3 lines 20-25, and column 2 lines 53-65).

With regard to claim 4, Gaebe teaches that more than one substrates or more than one adjusting layers may be included, (please see Figure 6).

With regard to claim 5, Gaebe teaches that other materials may be used as the multilayer film which means that the adjusting layer and the multilayer film may comprise different material, (please see column 4, line 21).

Double Patenting

7. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

8. **Claims 1-8 are provisionally** rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 and 7 of **copending Application No. 10/346,951**. Although the conflicting claims are not identical, they are not patentably distinct from each other because they both claim an optical filter having a multiplayer thin film that is comprised of alternatively stacked dielectric layers and an adjusting layer for adjusting temperature shift of the wavelength of the light filtered by the filter. The thickness measurement error due to the temperature variation as recited in the co-pending application is the same temperature effect as in the instant application. The equation for calculating TSCW and the value of TSCW are inherited by the filter structure.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Response to Arguments

9. Applicant's arguments with respect to amended claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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